



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,658	01/29/2004	Masaki Okamoto	36409	5389

116 7590 09/08/2006

PEARNE & GORDON LLP
1801 EAST 9TH STREET
SUITE 1200
CLEVELAND, OH 44114-3108

EXAMINER

PATEL, SHAMBHAVI K

ART UNIT	PAPER NUMBER
----------	--------------

2128

DATE MAILED: 09/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/767,658	Applicant(s) OKAMOTO ET AL.	
	Examiner Shambhavi Patel	Art Unit 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/29/04</u> . | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 2128

DETAILED ACTION

Claims 1-14 are pending.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 29 January 2004 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the Examiner has considered the IDS as to the merits.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 2, 3, 4, 5, and 13 and are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 2, 3, and 4: The meaning of the term 'analysis result data' is unclear. The meaning of the limitation 'wherein analysis result data simulated previously based on a plurality of conditions are generated every step' is also unclear.

Regarding claim 5: The limitation of the claim states that the analysis data can be derived from any of:

- i. the data simulated previously every step by using a CAE tool

Art Unit: 2128

- ii. mounting resultant data of a mounting equipment provided to a mounting site at every step
- iii. experimental data derived by an experiment in which an operation in each step is supposed.

However, the Examiner is unclear regarding the meaning of (i)-(iii). The Examiner interprets (i) to be equivalent to the conditions in claim 1. The Examiner is unable to derive an interpretation of (ii). The Examiner interprets (iii) to be equivalent to the data collected by the external device in claim 4.

Regarding claim 13: The meaning of the following limitation is unclear: 'a condition table forming portion forming a condition table that lists a simulation condition, which is formed by using a simulation result simulated based on a first condition selected for at least a first step, of a second step positioned subsequently to a first step'.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. **Claims 1-14 are rejected under 35 U.S.C. 101** because the claimed invention is directed to non-statutory subject matter. The Examiner asserts that the current state of the claim language is such that a reasonable interpretation of the claims would not result in any useful, concrete or tangible product.

Regarding claims 1, 13, and 14, executing a simulation of the second step does not produce a tangible result.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-14 are rejected under 35 U.S.C. 102(b)** as being clearly anticipated by Sarvar et al. ('Effective Modeling of the Reflow Soldering Process: Basis, Construction, and Operation of a Process Model'), herein referred to as Sarvar.

Regarding claims 1 and 14:

Sarvar is directed to a mounting process simulation program of causing a computer to execute a simulation of a mounting process composed of a plurality of steps, and a method of executing a simulation, comprising:

- a. a first simulation executing step of executing a simulation based on a first condition selected for a first step (Table III). The first condition that is selected is the *specific heat capacity*.
- b. a simulation condition deciding step of deciding a result simulated in the first simulation executing step as a simulation condition for a second step positioned subsequent to the first step (Table III; 'Modeling of an Exemplar Product and Process Combination'). The specific heat capacity is varied, and this value is used to calculate the peak temperatures.

Art Unit: 2128

- c. a second simulation executing step of executing a simulation-of the second step based on a second condition containing at least the simulation condition (**Table III**). The second condition, *peak temperature*, is calculated during the simulation based on the first condition, the *specific heat capacity*.

Regarding claim 2:

The term ‘analysis result data’ and the limitation ‘wherein analysis result data simulated previously based on a plurality of conditions are generated every step’ have ambiguous meanings as addressed above in the 35 U.S.C. 112 rejection. However, the Examiner will attempt to make a good faith interpretation in light of the specifications and prior art. The Examiner interprets ‘analysis result data’ to be any data produced in the first simulation step that is then analyzed and/or sampled in the second simulation step, and ‘wherein analysis result data simulated previously based on a plurality of conditions are generated every step’ to mean that this data is produced at every step.

Sarvar discloses simulating a typical reflow profile (page 128 ‘Radiative Heating’). The temperature is varied with time (*analysis data*), and this data is used to calculate the output.

Regarding claim 3:

The term ‘analysis result data’ and the limitation ‘wherein analysis result data simulated previously based on a plurality of conditions are generated every step’ have ambiguous meanings as addressed above in the 35 U.S.C. 112 rejection. However, the Examiner will attempt to make a good faith interpretation in light of the specifications and prior art. The Examiner interprets ‘analysis result data’ to be any data produced in the first simulation step that is then analyzed and/or sampled in the second simulation step, and ‘wherein analysis result data simulated previously based on a plurality of conditions are generated every step’ to mean that this data is produced at every step.

Art Unit: 2128

Sarvar discloses varying the specific heat capacity to record the temperature changes (**page 131 ‘Modeling Variable Materials Data’ paragraphs 1-3**). The variable behavior of the specific heat capacity is represented in the models using *interpolation tables for each variable material*.

Regarding claim 4:

The term ‘analysis result data’ and the limitation ‘wherein analysis result data simulated previously based on a plurality of conditions are generated every step’ have ambiguous meanings as addressed above in the 35 U.S.C. 112 rejection. However, the Examiner will attempt to make a good faith interpretation in light of the specifications and prior art. The Examiner interprets ‘analysis result data’ to be any data produced in the first simulation step that is then analyzed and/or sampled in the second simulation step.

Sarvar discloses deriving the specific heat capacity by using samples analyzed with a calibrated Mettler TA3000 differential scanning calorimeter (**page 129 ‘Specific Heat Capacity Values’ paragraph 1**). This is analogous to the outside device in the claim language. The derived value is then converted to a computed-readable value and used in the simulation (**page 132 ‘Modeling of an Exemplar Product and Process Combination’ paragraph 1**).

Regarding claim 5:

The claim has an ambiguous meaning as addressed above in the 35 U.S.C. 112 rejection. However, the Examiner has attempted to make a good faith interpretation in light of the specifications and prior art.

Sarvar discloses the simulation program of claim 4 wherein the experimental data is selected as the analysis result data (**page 129 ‘Specific Heat Capacity Values’ paragraph 1**). The specific heat capacity is experimentally derived and is then used in the simulation as the analysis result data to

Art Unit: 2128

calculate its effect on the temperature variation (page 132 'Modeling of an Exemplar Product and Process Combination' paragraph 1).

Regarding claim 6:

Sarvar discloses a mounting process simulation program according to claim 1, further causing the computer to execute an animation displaying step of displaying three-dimensionally an animation to indicate a result simulated in the second simulation executing step on a display device, by reading previously- stored animation elements based on a definition file in which an operation sequence is defined every step (figure 8; page 132 'Modeling of an Exemplar Product and Process Combination' paragraph 1).

Regarding claim 7:

Sarvar discloses a mounting process simulation program according to claim 1, wherein the second simulation executing step includes a condition acquiring step of reading a condition selected in response to an input from a condition database in which a plurality of conditions are stored previously in combination, and adding the condition to the second condition (page 131 'Modeling Variable Materials Data' paragraph 3). The specific heat capacity is modeled using tables.

Regarding claim 8:

Sarvar discloses a mounting process simulation program according to claim 7, wherein the condition acquiring step further reads data from a CAD system in response to the input and adds the data to the second condition (figure 1).

Regarding claim 9:

Sarvar discloses a mounting process simulation program according to claim 1, wherein the first simulation executing step executes the simulation to contain production variation in the first step (**Table III: production variation specific heat capacity**), the simulation condition deciding step decides the result simulated in the first simulation executing step to contain the production variation as the simulation condition and the second simulation executing step executes the simulation of the second step based on the second condition to contain the production variation (**Table III: simulation to determine variation in temperature due to variation in specific heat capacity**).

Regarding claim 10:

Sarvar is directed to a mounting process simulation program according to claim 1, wherein the first simulation executing step executes the simulation based on a change of a control item set in the first step as the first condition (**Table III: control item/first condition is specific heat capacity**), the simulation condition deciding step decides the result simulated based on the change of the control item in the first simulation executing step as the simulation condition, and the second simulation executing step executes the simulation of the second step based on the second condition to contain the result simulated based on at least the change of the control item (**Table III: simulation to determine variation in temperature due to variation in specific heat capacity**).

Regarding claim 11:

Sarvar is directed to a mounting process simulation program according to claim 1, further causing the computer to execute a reliability evaluating step of executing a reliability evaluation of a product manufactured in the mounting process by using the result simulated in the second simulation executing step (**figure 6**).

Art Unit: 2128

Regarding claim 12:

Sarvar is directed to a mounting process simulation program according to claim 1, further causing the computer to execute a fraction defective calculating step of calculating a fraction defective of a product manufactured in the first step and the second step, by using results simulated in the first simulation executing step and the second simulation executing step (**Introduction: paragraphs 2 and 3**).

Regarding claim 13:

The limitation 'a condition table forming portion forming a condition table that lists a simulation condition, which is formed by using a simulation result simulated based on a first condition selected for at least a first step, of a second step positioned subsequently to a first step' has an ambiguous meaning that a condition table is formed based on the values for the first condition.

Sarvar is directed to a mounting process simulation system provided to steps of a mounting process composed of a plurality of steps to execute a simulation of the mounting process, comprising:

- a. an inputting portion for inputting a condition to execute the simulation (**figure 1**)
- b. an executing portion for executing the simulation based on the condition input from the inputting portion (**figure 1**)
- c. an outputting portion for outputting a result of the simulation executed by the executing portion (**figure 1**)
- d. wherein the executing portion includes:
 - i. a condition table forming portion forming a condition table that lists a simulation condition, which is formed by using a simulation result simulated based on a first condition selected for at least a first step, of a second step positioned subsequently to a first step (**page 131 'Modeling Variable**

Materials Data' paragraphs 1-3). The first condition is the *specific heat capacity*, and this is modeled using an *interpolation table*.

- ii. simulation result outputting portion executes the simulation of the second step based on the condition table and a condition input from the inputting portion and outputs a result to the outputting portion (**page 131 'Modeling Variable Materials Data' paragraphs 1-3).** The variation of the temperature is calculated based on this first condition.

Art Unit: 2128


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shambhavi Patel whose telephone number is (571) 272-5877. The examiner can normally be reached on Monday-Friday, 8:00 am – 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-2279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SKP


KAMINI SHAH
SUPERVISORY PATENT EXAMINER